

PATENT ABSTRACTS OF JAPAN

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Prior Art 1

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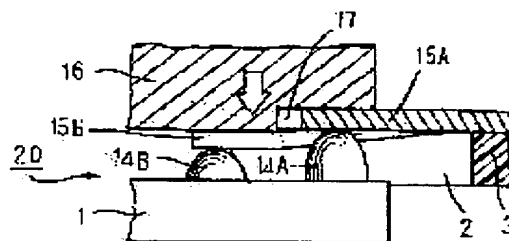
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(54) TAB TYPE SEMICONDUCTOR DEVICE AND MANUFACTURING DEVICE THEREFOR

(57)Abstract:

PURPOSE: To prevent a short-circuit and a decrease in a withstand voltage due to contact with a semiconductor pellet with longer inner lead in a TAB type semiconductor device having bump electrodes arranged in a zigzag manner.

CONSTITUTION: A TAB type semiconductor device 20 has a semiconductor pellet 1 disposed in a through hole 2 of an insulation film 3 and long and short inner leads 15A, 15B extended from the film 3 connected at the ends to bump electrodes 14A, 14B formed in a zigzag manner on the surface. The height of the outer electrode 14A is formed higher than that of the inner electrode 14B, and a recess step 17 to be engaged with the longer lead 15B is formed correspondingly along the peripheral edge of a lead pressing surface of a bonding tool 16.



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[Claim(s)]

[Claim 1] The TAB formula semiconductor device characterized by making an outside bump electrode higher than an inside bump electrode among two or more bump electrodes in what connected the point of the inner lead prolonged from the above-mentioned insulating film to two or more bump electrodes which have arranged the semiconductor pellet and were alternately formed in the bore of an insulating film in the periphery of the front face.

[Claim 2] The manufacturing installation of the TAB formula semiconductor device characterized by having provided the bonding tool which carries out thermocompression bonding of the nose of cam of an inner lead where length differs corresponding to each bump electrode to an outside bump electrode collectively among semiconductor pellets according to claim 1, and forming the concave level difference section along the periphery of the lead press side.

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the manufacturing installation of the TAB formula semiconductor device which connected the bump electrode of the semiconductor pellet arranged in the bore of an insulating film, and the nose of cam of the inner lead prolonged from an insulating film, and the TAB formula semiconductor device possessing the bonding tool which carries out thermocompression bonding of the bump electrode of the above-mentioned semiconductor pellet, and the nose of cam of an inner lead collectively in detail about a TAB formula semiconductor device and its manufacturing installation.

[0002]

[Description of the Prior Art] A TAB[Tape Automated Bonding] formula semiconductor device (10) is used for the camera IC attached to a flexible film-like printed circuit board etc., for example. Drawing 3 or drawing 5 is shown and the example is explained.

[0003] The frame-like film with which a semiconductor pellet and (3) consist of an insulating film in (A) of drawing 3, and (B) in (1), The bump electrode which Au heaped up the bore (4(4A) B) by which (2) was formed in the frame-like film (3), and was formed in the state of alternate arrangement on the circuit pattern of a semiconductor pellet (1) of plating, (5A) It is the inner lead which consists of a metallic foil formed in the frame-like film (3) (5B). It has length which the inner lead (5A) (5B) made correspond with the bump electrode (4A) (4B) arranged alternately, and is different. By carrying out thermocompression bonding of the nose of cam of each inner lead (5A) (5B) to a bump electrode (4A) (4B), where the interstitial segment is pasted up on a frame-like film (3), fixed support of the semiconductor pellet (1) is carried out inside the frame-like film (3).

[0004] It is made to arrange a bump electrode (4A) (4B) alternately in the above-mentioned TAB formula semiconductor device (10), as it is in the inclination which the number of bump electrodes (4A) (4B) increases by improvement in the degree of integration in a semiconductor pellet (1), therefore being mentioned above. In manufacture of this TAB formula semiconductor device (10), as shown in drawing 4, thermocompression bonding of the above-mentioned bump electrode (4A) (4B) is carried out at the nose of cam of an inner lead (5A) (5B) which bundles up by using the bonding tool (6) of the letter of a block, and

corresponds, respectively.

[0005]

[Problem(s) to be Solved by the Invention] By the way, in manufacture of the above-mentioned TAB formula semiconductor device (10), the bonding tool (6) equipped with the flat heating press side as shown in drawing 5 is used. If it is going to carry out thermocompression bonding of the nose of cam of an inner lead (5A) (5B) on the bump electrode (4A) (4B) corresponding to the bump electrode (4A) (4B) arranged alternately on the other hand Since the length at the nose of cam of an inner lead (5A) (5B) differs, the pressure-receiving area by the bonding tool (6) in the nose of cam of the inner lead (5B) of the longer one prolonged on an inside bump electrode (4B) and the thermal expansion by it It becomes larger than the inner lead (5A) of the shorter one prolonged on an outside bump electrode (4A). Consequently, the nose of cam of the inner lead (5B) of the longer one deforms, it becomes easy to contact the circuit pattern formed in the front face of a semiconductor pellet (1), and problems, such as a short circuit and a fall of a withstand voltage, are caused.

[0006]

[Means for Solving the Problem] As a solution means of the above-mentioned technical problem, the TAB formula semiconductor device concerning this invention is characterize by make an outside bump electrode higher than an inside bump electrode among two or more bump electrodes in what connected the point of the inner lead prolong from the above-mentioned insulating film to two or more bump electrodes which have arrange the semiconductor pellet and were alternately formed in the bore of an insulating film in the periphery of the front face.

[0007] Moreover, the manufacturing installation of the TAB formula semiconductor device concerning this invention possesses the bonding tool which carries out thermocompression bonding of the nose of cam of an inner lead where length differs corresponding to each bump electrode to an outside bump electrode collectively among the above-mentioned semiconductor pellets, and is characterized by forming the concave level difference section along the periphery of the lead press side.

[0008]

[Function] In this invention, having made the outside bump electrode higher than an inside bump electrode and by having formed the concave level difference section along the periphery of the lead press side of a bonding tool By locating in the above-mentioned concave level difference circles the inner lead of the longer one prolonged toward an inside bump electrode, when carrying out thermocompression bonding of the point of an inner lead to the bump electrode by the side of the above-mentioned inside and outside collectively It prevents beforehand that the inner lead of the longer one contacts the periphery of a semiconductor pellet front face.

[0009]

[Example] Hereafter, one example of this invention is explained based on drawing 1 and drawing 2 (A), and (B). In addition, in the following description, by the same reference number, the same composition member as drawing 3 or drawing 5 which shows the conventional technology displays, and omits explanation about the overlapping matter.

[0010] The semiconductor pellet with which the TAB formula semiconductor device (20) aligned the bump electrode (14A) (14B) alternately on the front face (1), Although the

junction unification of the frame-like film (3) is carried out by the thermocompression bonding of the inner lead (15A) (15B) and the above-mentioned bump electrode (14A) (14B) from which length differs. The height of the bump electrode (14A) of the outside where thermocompression bonding of the point of the inner lead (15A) of the shorter one is carried out so that it may expand to drawing 1 and may illustrate Au heaps up and plating conditions are adjusted so that the point of the inner lead (15B) of the longer one may become high as compared with the bump electrode (14B) of the inside by which thermocompression bonding is carried out.

[0011] On the other hand, corresponding to the difference of the height of the above-mentioned bump electrode (14A) (14B), the concave level difference section (17) is formed along the periphery of a lead press side by the bonding tool (16) side. When a bonding tool (16) presses an inner lead (15A) (15B) and the heat energy for thermocompression bonding is transmitted so that it may expand to drawing 1 and may illustrate, The inner lead (15B) of the longer one prolonged toward the upper part of an inside bump electrode (14B) from a frame-like film (3) is located in the above-mentioned concave level difference section (17). The state where the press force and heat energy from a bonding tool (16) are not transmitted to an inner lead (15B) is made by separating this portion from the heating press side of a bonding tool (16). namely, the state where the press force and heat energy from a bonding tool (16) are transmitted only to the point of the inner lead (15A) (15B) of the merits and demerits by which thermocompression bonding is carried out to the bump electrode (14A) (14B) from which height differs -- making -- this -- the point of the inner lead (15B) of the longer one at the time of bonding, and the point of the inner lead (15A) of the shorter one -- abbreviation -- equivalent thermocompression bonding. Consequently, deformation of the inner lead (15B) of the longer one is suppressed, and thermocompression bonding of the point of both inner leads (15A) (15B) is collectively carried out on a corresponding bump electrode (14A) (14B).

[0012]

[Effect of the Invention] Since the deformation of the inner lead of the longer one by which thermocompression bonding is carried out to an inside bump electrode is suppressed, while according to this invention the short circuit by the contact to the semiconductor pellet of an inner lead, the fall of a withstand voltage, etc. are avoided and the product yield improves sharply in the TAB formula semiconductor device which has the bump electrode of a large number arranged alternately, a quality TAB formula semiconductor device can be offered.

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審査請求 未請求 請求項の数2(全 4 頁)

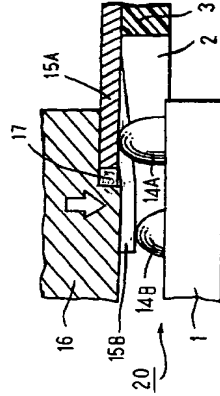
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(54)【発明の名称】 T A B式半導体装置及びその製造装置

(57)【要約】

【目的】 千鳥状に配置されたバンパ電極 (14A) (14B) を有するT A B式半導体装置 (20) において、長い方のインナリード (15B) の半導体ベレット (1) への接触による短絡や耐電圧の低下を未然に防止する。

【構成】 絶縁フィルム (3) の穿孔 (2) 内に半導体ベレット (1) を配置し、その表面に千鳥状に形成された各バンパ電極 (14A) (14B) に絶縁フィルム (3) 上から延びる長いインナリード (15A) (15B) の先端部を接続したT A B式半導体装置 (20) において、外側のバンパ電極 (14A) の高さより内側のバンパ電極 (14B) より高くし、これに対応して、ボンディングツール (16) のリード押圧面の周縁に沿って長い方のインナリード (15B) が嵌まり込む凹状の段差部 (17) を形成する。



【特許請求の範囲】

【請求項1】 絶縁フィルム上の穿孔内に半導体ベレットを配置し、その表面の周縁に千鳥状に形成された複数のバンパ電極に上記絶縁フィルム上から延びるインナリードの先端部を接続したものであるにおいて、複数のバンパ電極のうち、外側のバンパ電極を内側のバンパ電極よりも高くしたことを特徴とするT A B式半導体装置。

【請求項2】 請求項1記載の半導体ベレットの内、外側のバンパ電極に、各バンパ電極に対応して長さが異なるインナリードの先端を一括して熱圧着するボンディングツールを具備し、そのリード押圧面の周縁に沿って凹状の段差部を形成したことを特徴とするT A B式半導体装置の製造装置。

【発明の詳細な説明】

【0001】
【産業上の利用分野】 本発明はT A B式半導体装置及びその製造装置に関し、詳しくは、絶縁フィルム上の穿孔内に配置された半導体ベレットのバンパ電極と絶縁フィルムから延びるインナリードの先端とを接続したT A B式半導体装置、及び上記半導体ベレットのバンパ電極とインナリードの先端とを一括して熱圧着するボンディングツールを具備したT A B式半導体装置の製造装置に関する。

【0002】

【従来の技術】 T A B (Tape Automated Bonding) 式半導体装置 (10) は、例えば、フレキシブルなフィルム状プリント基板等に組み付けられるカメラ用 I C 等に使用される。その一例を図3乃至図5を示して説明する。

【0003】 図3の (A) (B) において、(1) は半導体ベレット、(3) は絶縁フィルムからなる枠状フィルム、(2) は枠状フィルム (3) に形成された穿孔、(4A) (4B) はA uの盛り上げメッキによって半導体ベレット (1) の配線パターン上に千鳥配置状態で形成されたバンパ電極、(5A) (5B) は枠状フィルム (3) に形成された金属箔からなるインナリードである。インナリード (5A) (5B) は、千鳥状に配置されたバンパ電極 (4A) (4B) と対応させて異なる長さの長さを有し、その中間部分を枠状フィルム (3) に接合した状態でそれぞれインナリード (5A) (5B) の先端をバンパ電極 (4A) (4B) に熱圧着することによって、半導体ベレット (1) を枠状フィルム (3) の内側に固定支持している。

【0004】 上記T A B式半導体装置 (10) では、半導体ベレット (1) における稜線の向上によりバンパ電極 (4A) (4B) の数が増加する傾向にあり、そのため、上述したようにバンパ電極 (4A) (4B) を千鳥状に配置するようにしている。このT A B式半導体装置 (10) の製造において、図4に示すように上記バンパ電極 (4A) (4B) は、ブロック状のボンディングツール (6) を使用することにより一括してそれぞれ対応するインナリード

ド (5A) (5B) の先端に熱圧着される。

【0005】

【発明が解決しようとする課題】 ところで、上記T A B式半導体装置 (10) の製造では、図5に示すように平坦な加熱押圧面を有したボンディングツール (6) を使用している。一方、千鳥状に配置されたバンパ電極 (4A) (4B) にインナリード (5A) (5B) の先端を対応するバンパ電極 (4A) (4B) 上に熱圧着しようとすると、インナリード (5A) (5B) の先端の長さが異なっているため、内側のバンパ電極 (4B) 上に延びる長い方のインナリード (5B) の先端でのボンディングツール (6) による受圧面積及びそれによる熱膨張が、外側のバンパ電極 (4A) 上に延びる短い方のインナリード (5A) よりも大きくなる。この結果、長い方のインナリード (5B) の先端が変形し、半導体ベレット (1) の表面に形成された配線パターンに接触し易くなり、短絡や耐電圧の低下等の問題が引き起こされる。

【0006】

【課題を解決するための手段】 上記課題の解決手段として、本発明に係るT A B式半導体装置は、絶縁フィルム上の穿孔内に半導体ベレットを配置し、その表面の周縁に千鳥状に形成された複数のバンパ電極に上記絶縁フィルム上から延びるインナリードの先端部を接続したものであるにおいて、複数のバンパ電極のうち、外側のバンパ電極の内側のバンパ電極よりも高くしたことを特徴とする。【0007】 また、本発明に係るT A B式半導体装置の製造装置は、上記半導体ベレットの内、外側のバンパ電極に、各バンパ電極に対応して長さが異なるインナリードの先端を一括して熱圧着するボンディングツールを具備し、そのリード押圧面の周縁に沿って凹状の段差部を形成したことを特徴とする。

【0008】

【作用】 本発明では、外側のバンパ電極を内側のバンパ電極よりも高くしたこと、及びボンディングツールのリード押圧面の周縁に沿って凹状の段差部を形成したことにより、上記内側のバンパ電極にインナリードの先端部を一括して熱圧着する時、内側のバンパ電極に向って延びる長い方のインナリードを上記凹状の段差部内に位置させることによって、長い方のインナリードが半導体ベレット表面の周縁に接触することを未然に防止する。

【0009】

【実施例】 以下、図1及び図2 (A) (B) に基づいて本発明の一実施例を説明する。尚、以下の記述において、従来技術を示す図3乃至図5と同一の構成部材は同一の参照番号で表示し、重複する事項に関しては説明を省略する。

【0010】 T A B式半導体装置 (20) は、表面にバンパ電極 (14A) (14B) を千鳥状に整列させた半導体ベレット (1) と、枠状フィルム (3) を、長さの異なるインナリード (15A) (15B) と上記バンパ電極 (14A) (14B)

